

CLAIMS

1. A wireless communication system that forms a network in an autonomous distributed manner without the relationship of a controlling station and a controlled station, the wireless communication system being characterized in that a transmitting-side or receiving-side communication apparatus that attempts to perform communication with a guaranteed bandwidth issues a notification indicating a setting of a bandwidth guaranteed period in own communication range and another communication apparatus that receives the notification does not perform a communication operation in the bandwidth guaranteed period.
2. The wireless communication system according to claim 1, characterized in that the transmitting-side or receiving-side communication apparatus describes information regarding the bandwidth guaranteed period in beacon information transmitted for each predetermined frame period.
3. The wireless communication system according to claim 2, characterized in that the receiving-side communication apparatus creates timing utilized for a bandwidth-guaranteed communication, in a pseudo manner, to have the same state as timing of transmitting own beacon and notifies of the timing

utilized for the bandwidth-guaranteed communication.

4. The wireless communication system according to claim 1, characterized in that, in a period in which any

5 communication apparatus has not set a band guarantee, each communication apparatus performs random access based on a collision avoidance operation that starts transmission after detecting that no transmission is performed from another communication apparatus.

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5. The wireless communication system according to claim 1, characterized in that the transmitting-side or receiving-side communication apparatus sets a reservation period in own frame period and performs communication with a

15 guaranteed bandwidth by utilizing the reservation period.

6. The wireless communication system according to claim 1, characterized in that each communication apparatus collects beacon information from neighboring communication

20 apparatuses; obtains information regarding bandwidth guaranteed periods; and does not set, as own bandwidth guaranteed period, a period that is set as the bandwidth guaranteed periods by the neighboring communication apparatuses.

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7. The wireless communication system according to claim 1, characterized in that the transmitting-side or receiving-side communication apparatus collects beacon information from neighboring communication apparatuses; obtains  
5 information regarding bandwidth guaranteed periods; and sets, as the own bandwidth guaranteed period, a period that is not set as the bandwidth guaranteed periods by the neighboring communication apparatuses.

10 8. The wireless communication system according to claim 1, characterized in that the transmitting-side or receiving-side communication apparatus obtains information regarding a bandwidth guaranteed period from a communication apparatus at another end of communication and sets, as the own  
15 bandwidth guaranteed period, a period that is not set as bandwidth guaranteed periods by neighbors of the communication apparatus.

9. A wireless communication system that forms a network  
20 in an autonomous distributed manner without the relationship of a controlling station and a controlled station, the wireless communication system being characterized in that  
a transmitting-side or receiving-side communication  
apparatus sets a period utilizable with priority in own  
25 frame period and performs communication with a guaranteed

bandwidth by utilizing the priority utilization period with priority.

10. The wireless communication system according to claim  
5 9, characterized in that the transmitting-side or receiving-side communication apparatus describes information regarding the priority utilization period in beacon information transmitted for each predetermined frame period.

10 11. The wireless communication system according to claim 9, characterized in that, in a period in which any communication apparatus has not set a priority utilization, each communication apparatus performs random access based on a collision avoidance operation that starts transmission  
15 after detecting that no transmission is performed from another communication apparatus.

12. The wireless communication system according to claim  
9, characterized in that, before the priority utilization  
20 period ends, when transmitting-side communication apparatus and the receiving-side communication apparatus have completed the communication with a guaranteed bandwidth or have not performed the communication, other communication apparatuses perform arbitrarily communication with each  
25 other in the priority utilization period.

13. The wireless communication system according to claim 6, characterized in that the transmitting-side communication apparatus temporarily delays the start of communication from the self and performs transmission based on a priority utilization after the end of another communication, in a case in which the another communication is performed at a point of time when a priority utilization period set by the self arrives.

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14. The wireless communication system according to claim 9, characterized in that each communication apparatus collects beacon information from neighboring communication apparatuses; obtains information regarding priority utilization periods; and does not set, as own priority utilization period, a period that is set as the priority utilization periods by the neighboring communication apparatuses.

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15. The wireless communication system according to claim 9, characterized in that the transmitting-side or receiving-side communication apparatus collects beacon information from neighboring communication apparatuses; obtains information regarding priority utilization periods; and sets, as own priority utilization period, a period that is not set

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as the priority utilization periods by the neighboring communication apparatuses.

16. The wireless communication system according to claim  
5 9, characterized in that the transmitting-side or receiving-side communication apparatus obtains information regarding a priority utilization period from a communication apparatus at another end of communication and sets, as own priority utilization period, a period that is not set as priority  
10 utilization periods by neighbors of the communication apparatus.

17. A wireless communication apparatus that performs a wireless communication operation in an autonomous  
15 distributed manner without the relationship of a controlling station and a controlled station, the wireless communication apparatus being characterized by comprising:

communicating means for transmitting/receiving a wireless signal within own communication range;  
20 bandwidth-guaranteed-period setting means for requesting, within the own communication range, the setting of a bandwidth guaranteed period in which a bandwidth is guaranteed; and

communication controlling means for executing a  
25 bandwidth-guaranteed communication in response to the

arrival of own bandwidth guaranteed period.

18. The wireless communication apparatus according to claim 17, characterized by further comprising means for  
5 storing a bandwidth-guaranteed-period setting notification received from another communication apparatus,

wherein the bandwidth-guaranteed-period setting means sets the own bandwidth guaranteed period while avoiding a bandwidth guaranteed period that is already set by the  
10 another communication apparatus, and

the communication controlling means does not perform a communication operation in the bandwidth guaranteed period that is set by the another communication apparatus.

15 19. The wireless communication apparatus according to claim 17, characterized in that, in a period in which any communication apparatus has not set a bandwidth guarantee, the communication controlling means performs random access based on a collision avoidance operation that starts  
20 transmission after detecting that no transmission is performed from another communication apparatus.

20. The wireless communication apparatus according to claim 17, characterized in that the bandwidth-guaranteed-  
25 period setting means describes information regarding the

bandwidth guaranteed period in information of a beacon to be transmitted for each predetermined frame period and transmits the beacon to thereby inform, within the own communication range, about the setting of the bandwidth  
5 guaranteed period.

21. The wireless communication apparatus according to claim 20, characterized in that the bandwidth-guaranteed-period setting means sets the own bandwidth guaranteed  
10 period by avoiding the reception timing of a beacon.

22. The wireless communication apparatus according to claim 20, characterized in that the bandwidth-guaranteed-period setting means creates timing utilized for a  
15 bandwidth-guaranteed communication in the frame period, in a pseudo manner, to have the same state as timing of transmitting own beacon and notifies of the timing utilized for the bandwidth-guaranteed communication.

20 23. The wireless communication apparatus according to claim 17, characterized in that the bandwidth-guaranteed-period setting means sets a reservation period for performing communication with a guaranteed bandwidth in own frame period and the communication controlling means  
25 performs communication with a guaranteed bandwidth in the



own reservation period.

24. The wireless communication apparatus according to claim 17, characterized in that the bandwidth-guaranteed-  
5 period setting means of each communication apparatus collects beacon information from neighboring communication apparatuses; obtains information regarding bandwidth guaranteed periods; and does not set, as the own bandwidth guaranteed period, a period that is set as the bandwidth  
10 guaranteed periods by the neighboring communication apparatuses.

25. The wireless communication apparatus according to claim 17, characterized in that the bandwidth-guaranteed-  
15 period setting means of the transmitting-side or receiving-side communication apparatus collects beacon information from neighboring communication apparatuses; obtains information regarding bandwidth guaranteed periods; and sets a period that is not set as the bandwidth guaranteed periods  
20 by the neighboring communication apparatuses to the own bandwidth guaranteed period.

26. The wireless communication apparatus according to claim 17, characterized in that the bandwidth-guaranteed-  
25 period setting means of the transmitting-side or receiving-

side communication apparatus obtains information regarding a bandwidth guaranteed period from a communication apparatus at another end of communication and sets a period that is not set as bandwidth guaranteed periods by neighbors of the communication apparatus to the own bandwidth guaranteed period.

27. A wireless communication apparatus that performs a wireless communication operation in an autonomous distributed manner without the relationship of a controlling station and a controlled station, the wireless communication apparatus being characterized by comprising:

communicating means for transmitting/receiving a wireless signal in own communication range;

15 priority-utilization-period setting means for setting a priority utilization period for performing communication with a guaranteed bandwidth in own frame period and notifying, within the own communication range, of the priority utilization period; and

20 communication controlling means for performing communication with a guaranteed bandwidth, with priority, in response to the arrival of the own priority utilization period.

25 28. The wireless communication apparatus according to

claim 27, characterized in that the priority-utilization-period setting means describes information regarding the priority utilization period in information of a beacon to be transmitted for each predetermined frame period and  
5 transmits the beacon to thereby notify, within the own communication range, of the setting of the priority utilization period.

29. The wireless communication apparatus according to  
10 claim 27, characterized in that the communication controlling means performs random access based on a collision avoidance operation that starts transmission after detecting that no transmission is performed from another communication apparatus, as required, in a period in which  
15 any communication does not set a priority utilization.

30. The wireless communication apparatus according to claim 27, characterized in that, before the priority utilization period set by the bandwidth-guaranteed-period  
20 setting means ends, when communication utilizing a band with priority has been finished or has not been performed, arbitrarily communication between other communication apparatuses is permitted in the priority utilization period.

25 31. The wireless communication apparatus according to

claim 27, characterized in that the communication  
controlling means temporarily delays the start of  
communication in the priority utilization period and  
performs transmission based on the priority utilization  
5 after the end of another communication, in a case in which  
the another communication is performed at a point of time  
when the priority utilization period set by the self arrives.

32. The wireless communication apparatus according to  
10 claim 27, characterized in that the bandwidth-guaranteed-  
period setting means of each communication apparatus  
collects beacon information from neighboring communication  
apparatuses; obtains information regarding priority  
utilization periods; and does not set, as own priority  
15 utilization period, a period that is set as the priority  
utilization periods by the neighboring communication  
apparatuses.

33. The wireless communication apparatus according to  
20 claim 27, characterized in that the priority-utilization-  
period setting means of the transmitting-side or receiving-  
side communication apparatus collects beacon information  
from neighboring communication apparatuses; obtains  
information regarding priority utilization periods; and sets,  
25 as own priority utilization period, a period that is not set

as the priority utilization periods by the neighboring communication apparatuses.

34. The wireless communication apparatus according to  
5 claim 27, characterized in that the priority-utilization-  
period setting means of the transmitting-side or receiving-  
side communication apparatus obtains information regarding a  
priority utilization period from a communication apparatus  
at another end of communication and sets a period that is  
10 not set as priority utilization periods by neighbors of the  
communication apparatus to own priority utilization period.

35. A wireless communication method for performing a  
wireless communication operation in an autonomous  
15 distributed manner without the relationship of a controlling  
station and a controlled station, the wireless communication  
method being characterized by comprising:

a bandwidth-guaranteed-period setting step of issuing,  
to within own communication range, a notification indicating  
20 the setting of a bandwidth guaranteed period in which a  
bandwidth is guaranteed; and

a communication controlling step of executing a  
bandwidth-guaranteed communication in response to the  
arrival of own bandwidth guaranteed period.

36. The wireless communication method according to claim 35, characterized by further comprising a step of storing a bandwidth-guaranteed-period setting notification received from another communication apparatus, and

5 wherein the bandwidth-guaranteed-period setting means sets the own bandwidth guaranteed period while avoiding a bandwidth guaranteed period that is already set by the another communication apparatus, and

the communication controlling means does not perform a  
10 communication operation in the bandwidth guaranteed period that is set by the another communication apparatus.

37. The wireless communication method according to claim 35, characterized in that, in a period in which any  
15 communication apparatus has not set a bandwidth guarantee, random access based on a collision avoidance operation, which starts transmission after detecting that no transmission is performed from another communication apparatus, is performed in the communication controlling  
20 steps.

38. The wireless communication method according to claim 35, characterized in that, in the bandwidth-guaranteed-period setting step, information regarding the bandwidth  
25 guaranteed period is described in information of a beacon to

be transmitted for each predetermined frame period and the beacon is transmitted to thereby inform, within the own communication range, about the setting of the bandwidth guaranteed period.

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39. The wireless communication method according to claim 38, characterized in that, in the bandwidth-guaranteed-period setting step, the own bandwidth guaranteed period is set by avoiding the reception timing of a beacon.

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40. The wireless communication method according to claim 38, characterized in that, in the bandwidth-guaranteed-period setting step, timing utilized for a bandwidth-guaranteed communication in the frame period is created in a pseudo manner to have the same state as timing of transmitting own beacon and a notification indicating the timing utilized for the bandwidth-guaranteed communication is issued.

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41. The wireless communication method according to claim 35, characterized in that, in the bandwidth-guaranteed-period setting step, a reservation period for performing communication with a guaranteed bandwidth is set in own frame period and, in the communication controlling step, communication with a guaranteed bandwidth is performed in

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the own reservation period.

42. The wireless communication method according to claim  
35, characterized in that, in the bandwidth-guaranteed-  
5 period setting step of each communication apparatus, beacon  
information is collected from neighboring communication  
apparatuses, information regarding bandwidth guaranteed  
periods is obtained, and a period that is set as the  
bandwidth guaranteed periods by the neighboring  
10 communication apparatuses is not set as the own bandwidth  
guaranteed period.

43. The wireless communication method according to claim  
35, characterized in that, in the bandwidth-guaranteed-  
15 period setting step of a transmitting-side or receiving-side  
communication apparatus, beacon information is collected  
from neighboring communication apparatuses, information  
regarding bandwidth guaranteed periods is obtained, and a  
period that is not set as the bandwidth guaranteed periods  
20 by the neighboring communication apparatuses is set to the  
own bandwidth guaranteed period.

44. The wireless communication method according to claim  
35, characterized in that, in the bandwidth-guaranteed-  
25 period setting step of a transmitting-side or receiving-side



communication apparatus, information regarding a bandwidth  
guaranteed period is obtained from a communication apparatus  
at another end of communication and a period that is not set  
as bandwidth guaranteed periods by neighbors of the  
5 communication apparatus is set to the own bandwidth  
guaranteed period.

45. A wireless communication method that performs a  
wireless communication operation in an autonomous  
10 distributed manner without the relationship of a controlling  
station and a controlled station, the wireless communication  
method being characterized by comprising:

a priority-utilization-period setting step of setting a  
priority utilization period for performing communication  
15 with a guaranteed bandwidth in own frame period and  
notifying, within a own communication range, of the priority  
utilization period; and

a communication controlling step of performing  
communication with a guaranteed bandwidth, with priority, in  
20 response to the arrival of the own priority utilization  
period.

46. The wireless communication method according to claim  
45, characterized in that, in the priority-utilization-  
25 period setting step, information regarding the priority

utilization period is described in information of a beacon to be transmitted for each predetermined frame period and the beacon is transmitted to thereby notify, within the own communication range, of the setting of the priority  
5 utilization period.

47. The wireless communication method according to claim 45, characterized in that, in a period in which any communication does not set a priority utilization, random  
10 access based on a collision avoidance operation, which starts transmission after detecting that no transmission is performed from another communication apparatus, is performed as required.

15 48. The wireless communication method according to claim 45, characterized in that, before the priority utilization period set in the priority-utilization-period setting means ends, when communication utilizing a bandwidth with priority has been finished or has not been performed, arbitrarily  
20 communication between other communication apparatuses is permitted in the priority utilization period.

49. The wireless communication method according to claim 45, characterized in that, in the communication controlling  
25 step, the start of communication in the priority utilization

period is temporarily delayed and transmission based on the  
priority utilization is performed after the end of another  
communication, in a case in which the another communication  
is performed at a point of time when the priority  
5 utilization period set by the self arrives.

50. The wireless communication method according to claim  
45, characterized in that, in the priority-utilization-  
period setting means of each communication apparatus, beacon  
10 information is collected from neighboring communication  
apparatuses, information regarding priority utilization  
periods is obtained; and a period that is set as the  
priority utilization periods by the neighboring  
communication apparatuses is not set as own priority  
15 utilization period.

51. The wireless communication method according to claim  
45, characterized in that, in the priority-utilization-  
period setting step of a transmitting-side or receiving-side  
20 communication apparatus, beacon information is collected  
from neighboring communication apparatuses, information  
regarding priority utilization periods is obtained, and a  
period that is not set as the priority utilization periods  
by the neighboring communication apparatuses is set as own  
25 priority utilization period.

52. The wireless communication method according to claim 45, characterized in that, in the priority-utilization-period setting step of a transmitting-side or receiving-side communication apparatus, information regarding a priority utilization period is obtained from a communication apparatus at another end of communication and a period that is not set as priority utilization periods by neighbors of the communication apparatus is set to own priority utilization period.

53. A computer program described in a computer-readable format so that processing for performing a wireless communication operation in an autonomous distributed manner without the relationship of a controlling station and a controlled station is executed on a computer system, the computer program being characterized by comprising:

- a bandwidth-guaranteed-period setting step of notifying, within own communication range, of the setting of a bandwidth guaranteed period in which a bandwidth is guaranteed; and
- a communication controlling step of executing a bandwidth-guaranteed communication in response to the arrival of own bandwidth guaranteed period.

54. The computer program according to claim 53, characterized by further comprising a step of storing a bandwidth-guaranteed-period setting request received from another communication apparatus, and

5        wherein, in the bandwidth-guaranteed-period setting step, the own bandwidth guaranteed period is set while avoiding a bandwidth guaranteed period that is already set by the another communication apparatus, and

          in the communication controlling step, a communication  
10 operation is not performed in the bandwidth guaranteed period that is set by the another communication apparatus.

55. A computer program described in a computer-readable format so that processing for performing a wireless  
15 communication operation in an autonomous distributed manner without the relationship of a controlling station and a controlled station is executed on a computer system, the computer program being characterized by comprising:

          a priority-utilization-period setting step of setting a  
20 priority utilization period for performing communication with a guaranteed bandwidth in own frame period and notifying, within own communication range, of the priority utilization period; and

          a communication controlling step of performing  
25 communication with a guaranteed bandwidth, with priority, in

response to the arrival of the own priority utilization period.